VisPortal

Exploring Grid-Enabled Remote/Distributed Visualization through a Web/Portal Interface

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Motivation

- Distributed Collaboratory Support
  - Astrophysics Simulation Collaboratory, Cosmic Simulator, GridLab
- One interface to control Distributed Resources
  - Workflows that cross multiple machines or organizations (vizserver?)
- Deployment Issues
  - Scientists hate to install anything!
  - Grid client software mgmt. remains challenging
- Hiding Complexity of the Grid
  - Manage complexity on **one** machine instead of many
  - Uniform user environment

Caveats

- Usability
  - Do they like it? (friendly users)
  - Do **we** like it?
  - Alternative GUI designs
- Programmability
  - Half of this project is determination of whether such technology is practical for production deployment!
- Grid Issues
  - Infrastructure is a moving target
  - Authorization, file sharing, file permissions control

Collaboration?

- Not yet (or at least not directly)
- Workflows for **existing** collaborations
- Central indices for shared files
- Nexus for lauching shared-applications

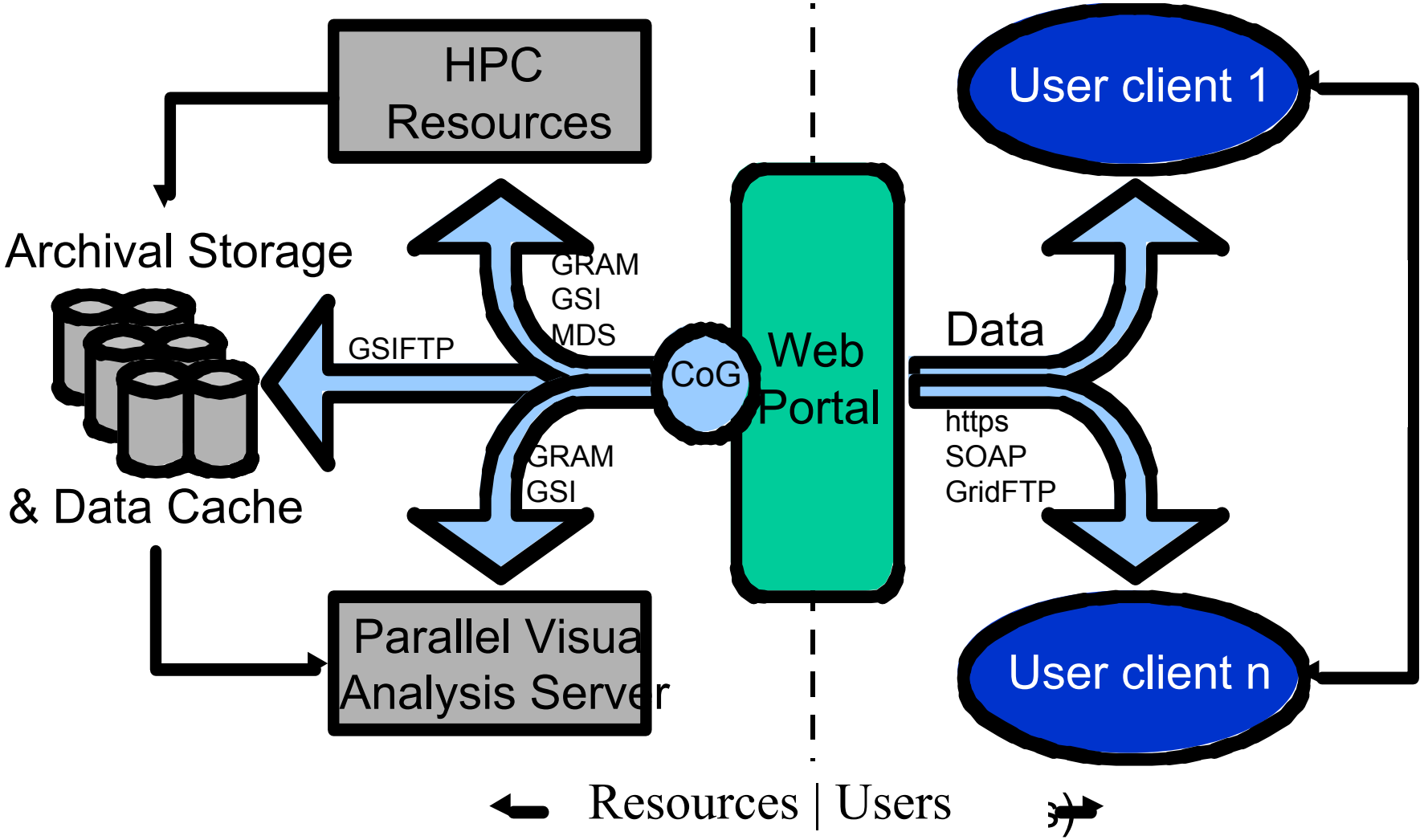
Implementation Issues

- Choice of Development Platform
  - Java
  - CGI
  - JSP
  - Webware
  - XWT
- Managing the limitations of the DHTML Interface
  - Browser compatibility
  - High latency interface
  - Weak options for GUI presentation
- User “state” management
  - Serialized java beans
  - SQL database back-end

Software Components

- Apache 1.3.27
- Tomcat 3.3.1
- gpdk cvs version
- Java CoG v1.0a
- mod_jk 1.3
- mod_ssl 2.8.12
- openssl 0.9.6h
- globus 2.x
- java 1.3.1_03
- java 1.4.x
- MyProxy 1.0
- log4j_1.2.7

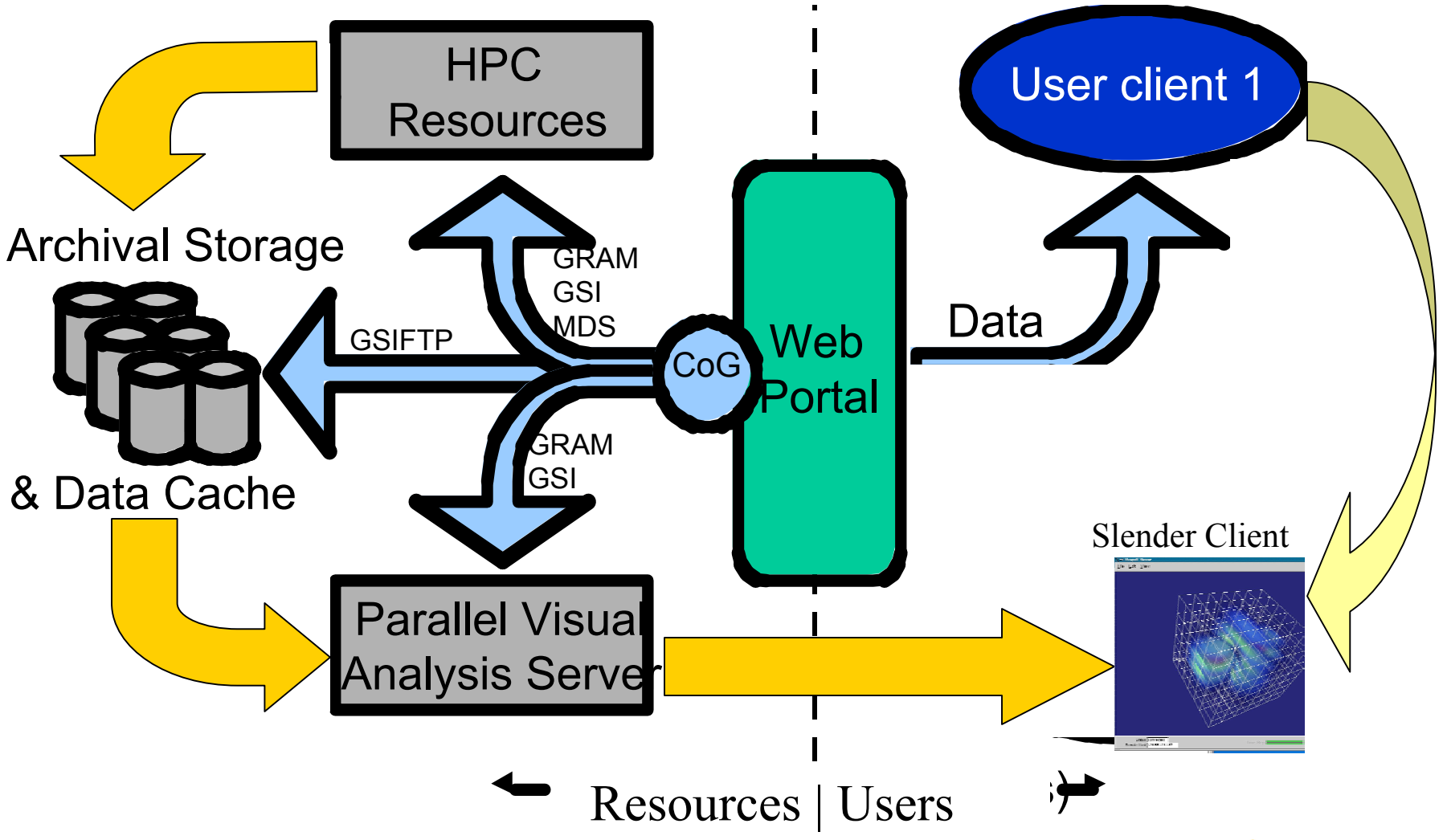
Portal Architecture



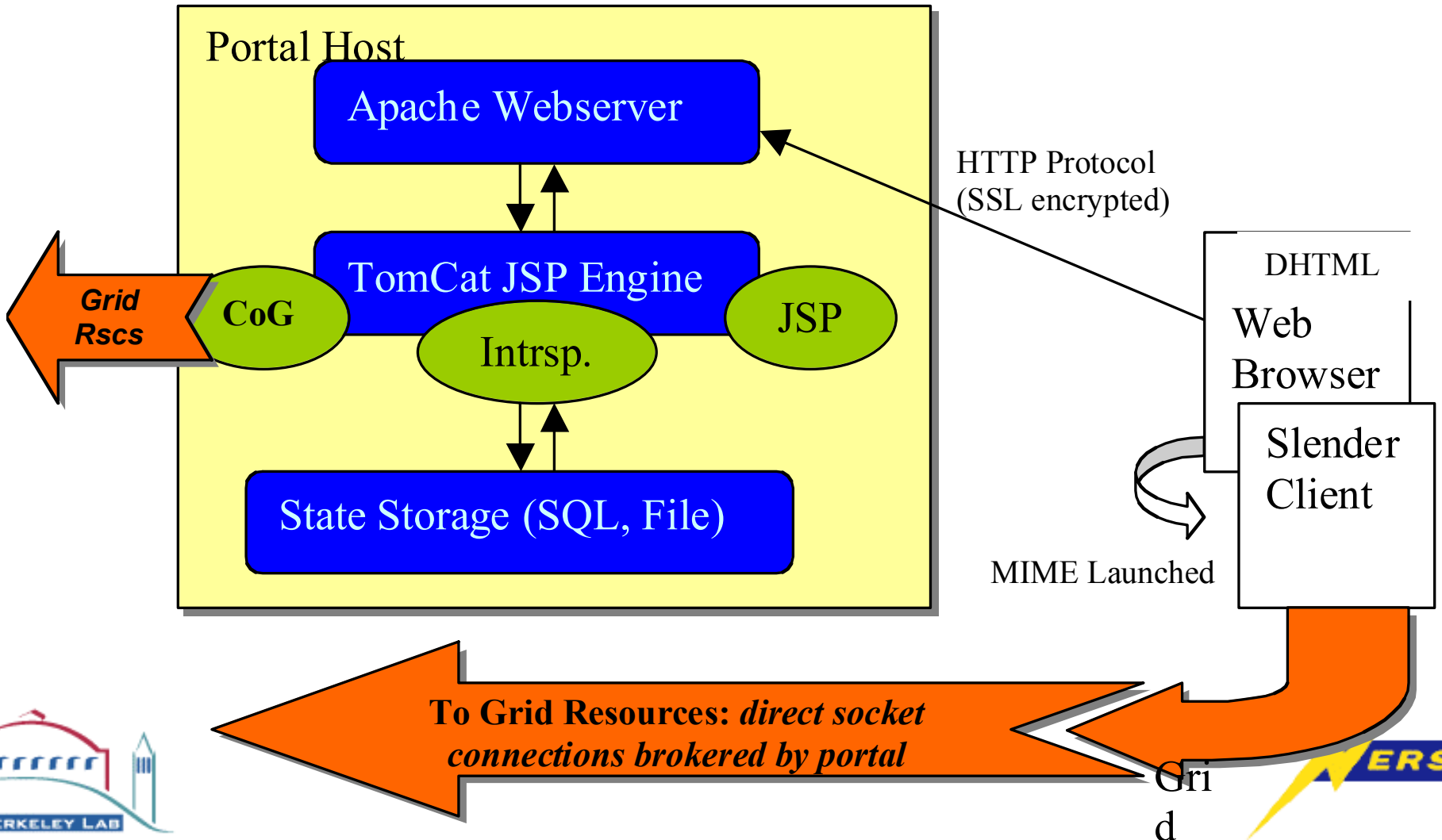
Client Deployment Paradigms

- Thin Client: no client-side software installation
  - *DHTML*
  - *Java Applets*
- Slender Client: minimal client-side installation
  - *Download on each use (signed java apps or small binaries)*
  - *Minimize porting effort with locally-responsive GUI*
- Thick Client: integrating desktop/standalone apps with portal
  - *Portal acts as resource broker*
  - *Portal as central index into distributed data repositories*
  - *Portal as nexus for establishing collaborative sessions*

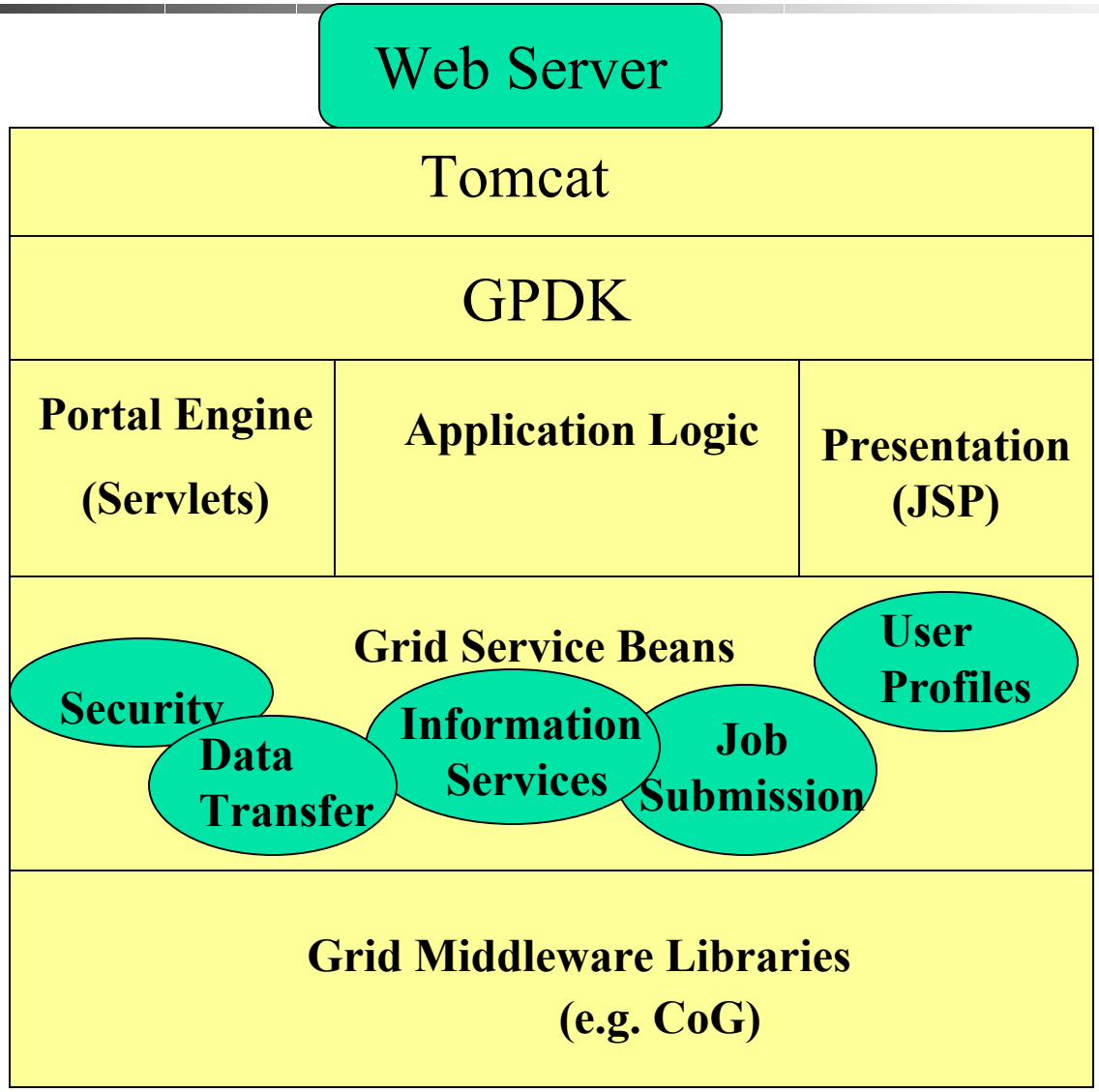
Portal Architecture *(slender clients)*



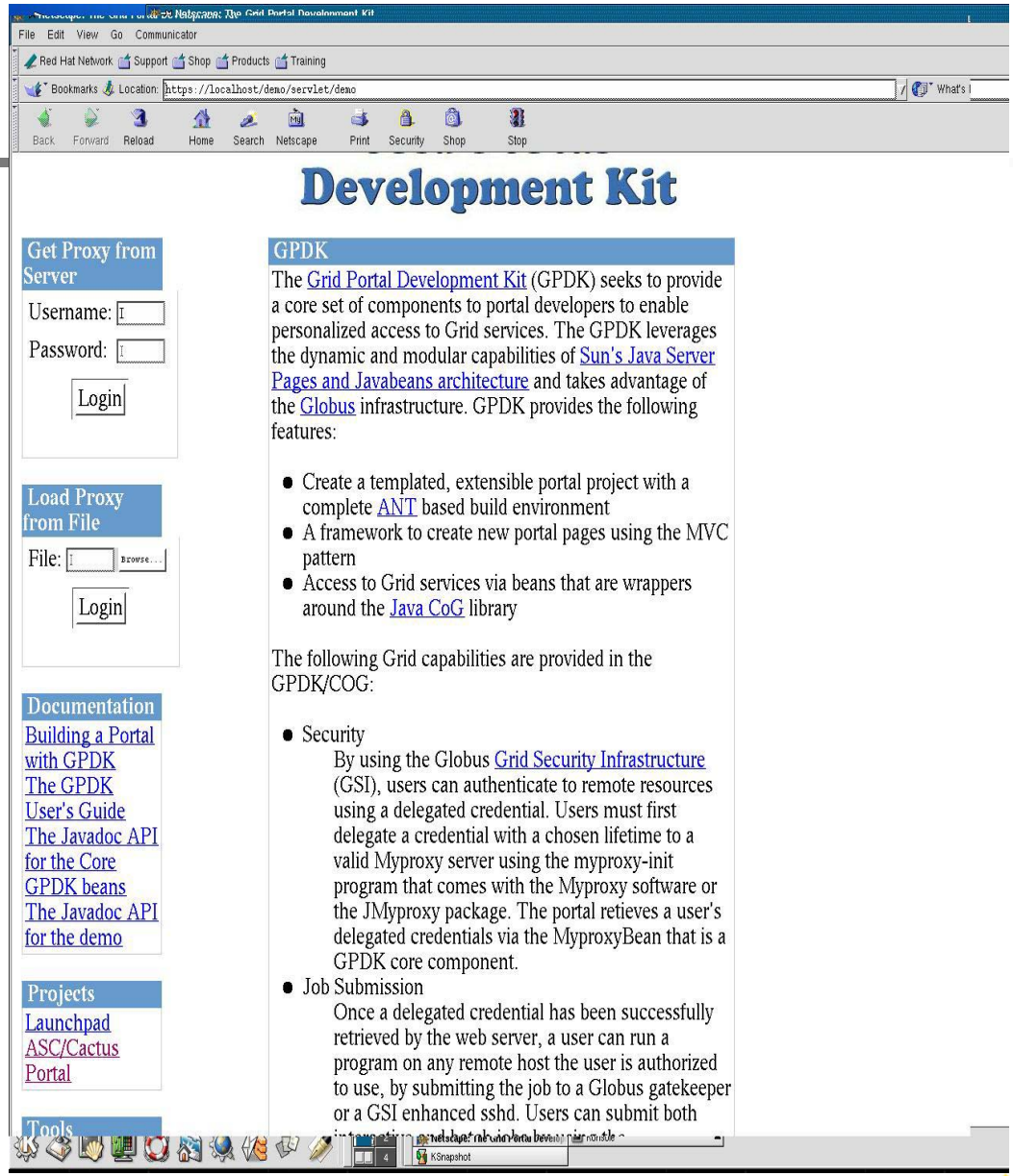
Internal Architecture



Internal Architecture

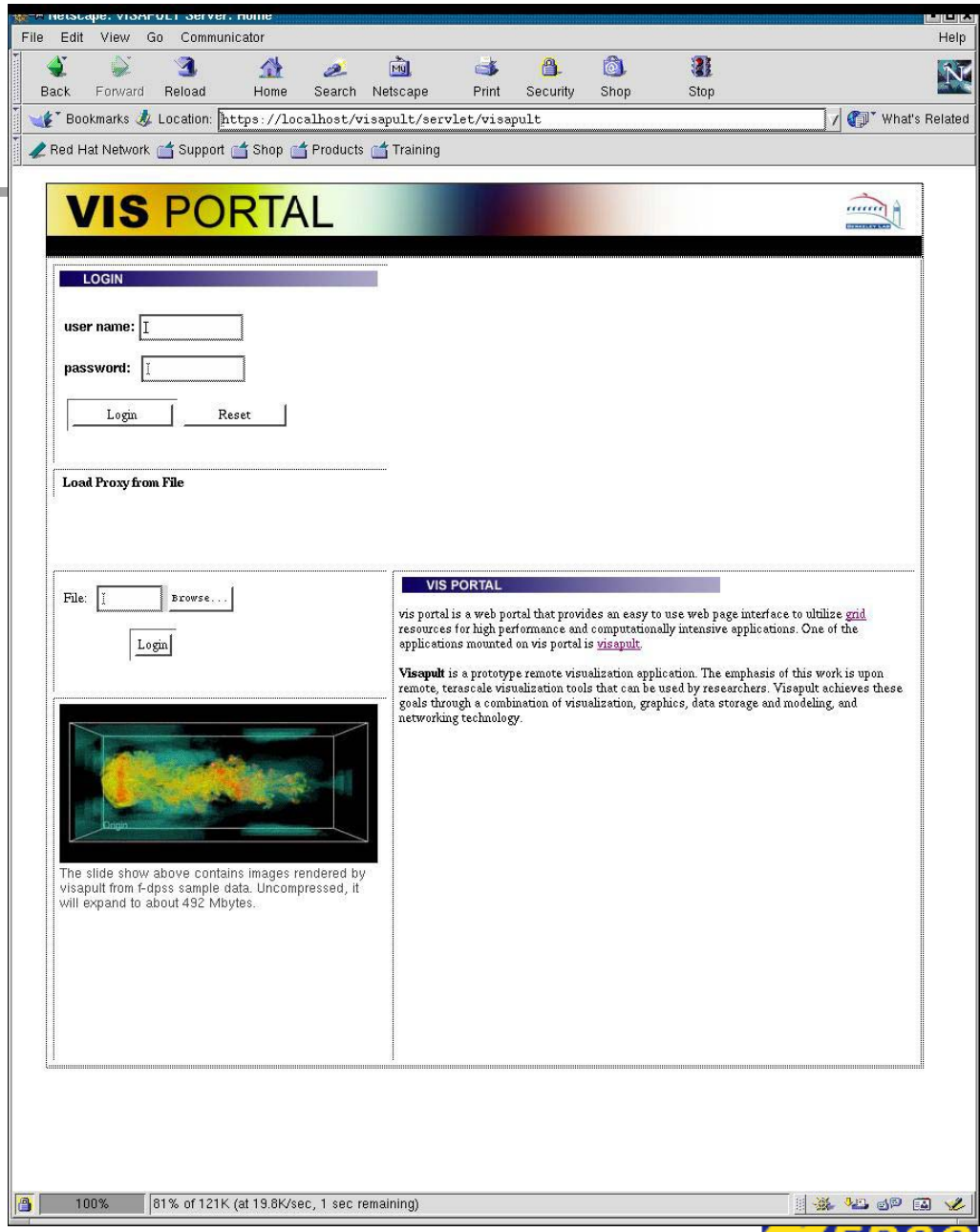


GPDK Demo Portal



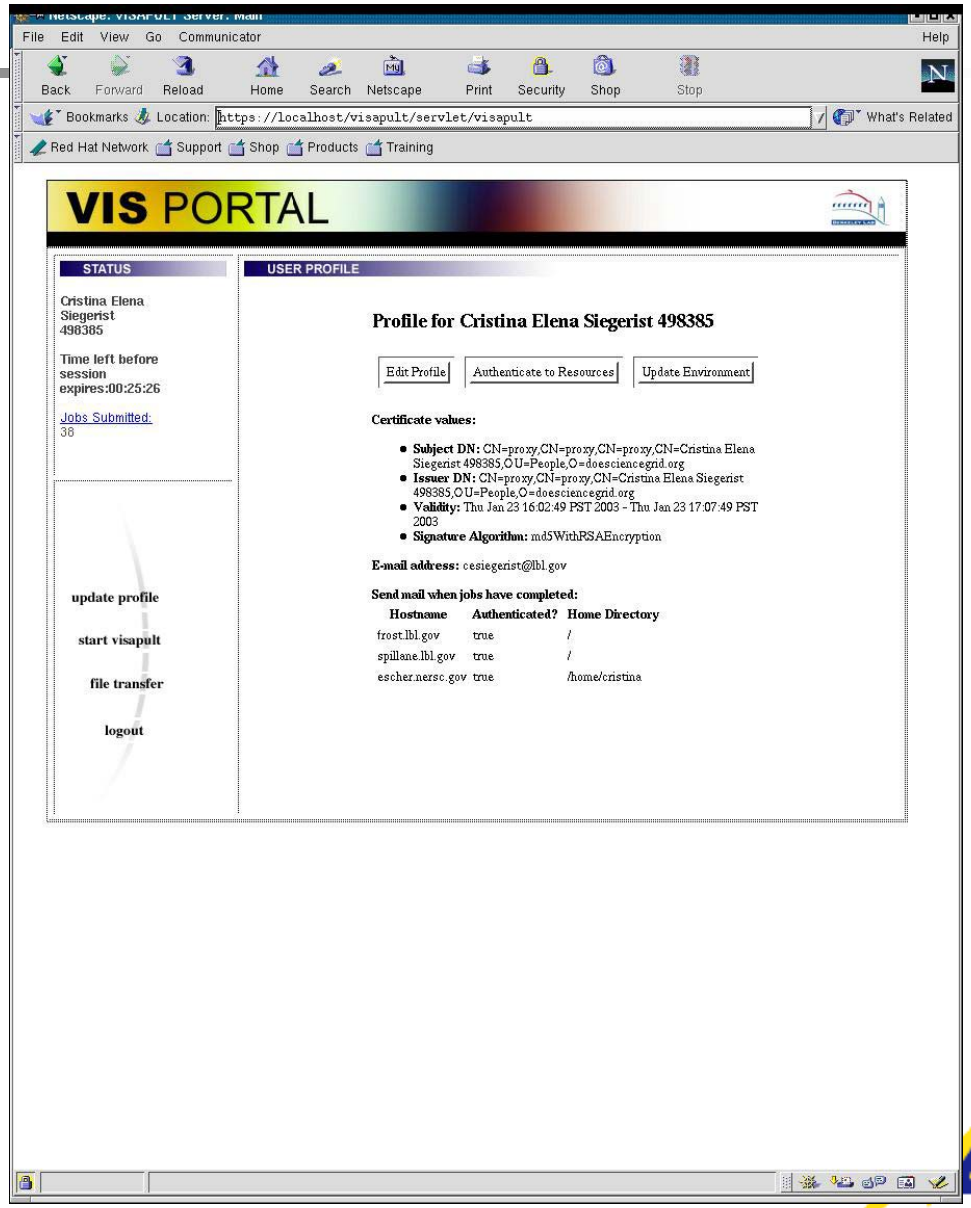
Login Page

- Myproxy: Username and password of delegated credential
- Local: Load credential from file



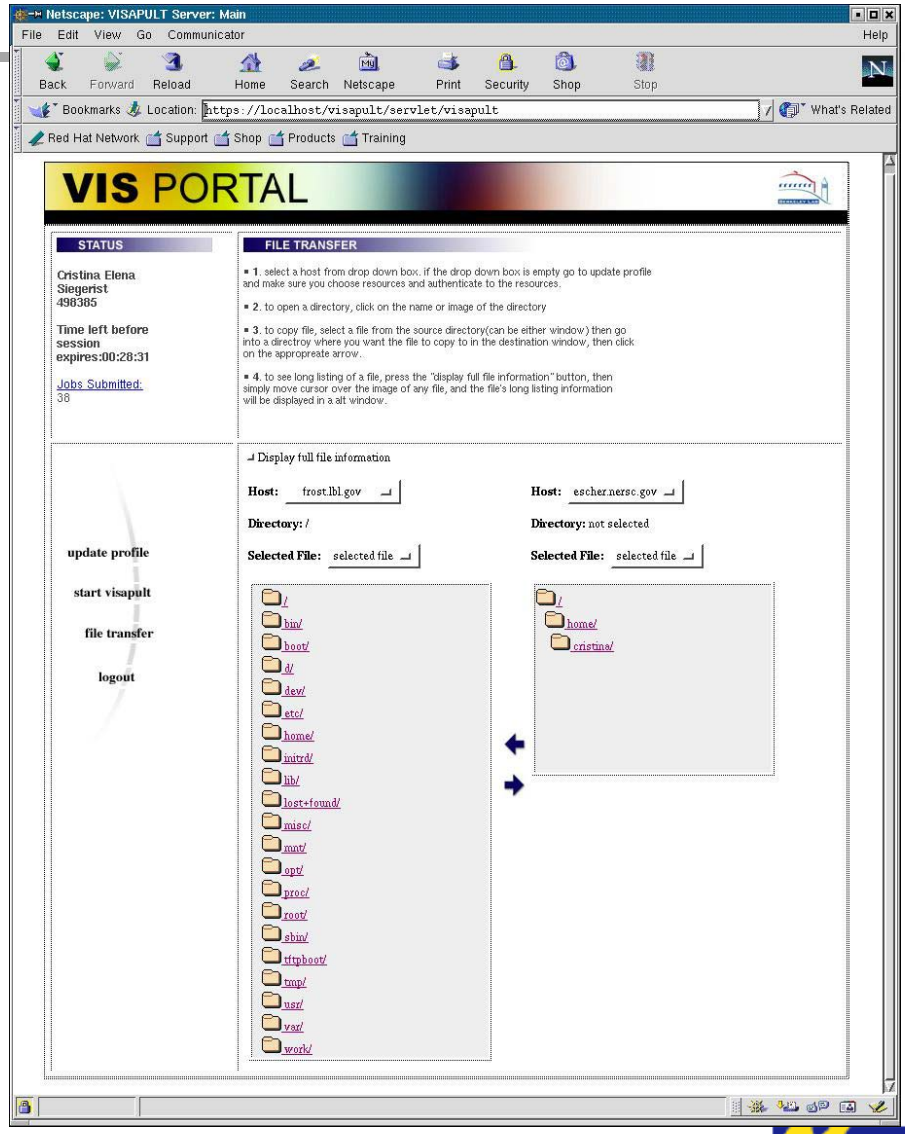
Profile

- Update user's
  resources
  job history
  email address



File Mgmt.

- Foreground transfers
- Background Transfers
- Globus File Yanker (Shreyas Cholia)



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Netscape Print Security Shop Stop

t/visapult/servlet/visapult

ucts Training

VIS PORTAL

STATUS

Cristina Elena Siegerist
498385

Time left before session expires:00:29:00

Jobs Submitted:
39

START VISAPULT

- 1.for instructions on how to start visapult, click here.
- 2.for instructions on how to operate file browsing window, click here.

update profile

start visapult

file transfer

logout

Viewer

Viewer Host

Back End

Data Type avs

Num Procs 4

res 6

min 0 max 1

palette

Display full file information

Host: escher.nersc.gov

Directory: /home/cristina/visapult/visapult-2/data/

Selected File: selected file

- /
  - home/
    - cristina/
    - AMRData/
    - AMRRenderer/
    - AVSProj/
    - etc/
    - globus/
    - grid.txt
    - idl.ps
    - javascript.txt
    - makempg.pro
    - mpg_batch_idl
    - nsmail/
    - sc99Palette
    - selected file
    - test1.eps
    - test2.eps
    - visapult/
      - visapult-2/
        - CVS/
        - backEnd/

Visapult Viewer

File Edit View

Origin

Status connected

Remote Host 128.55.128.157

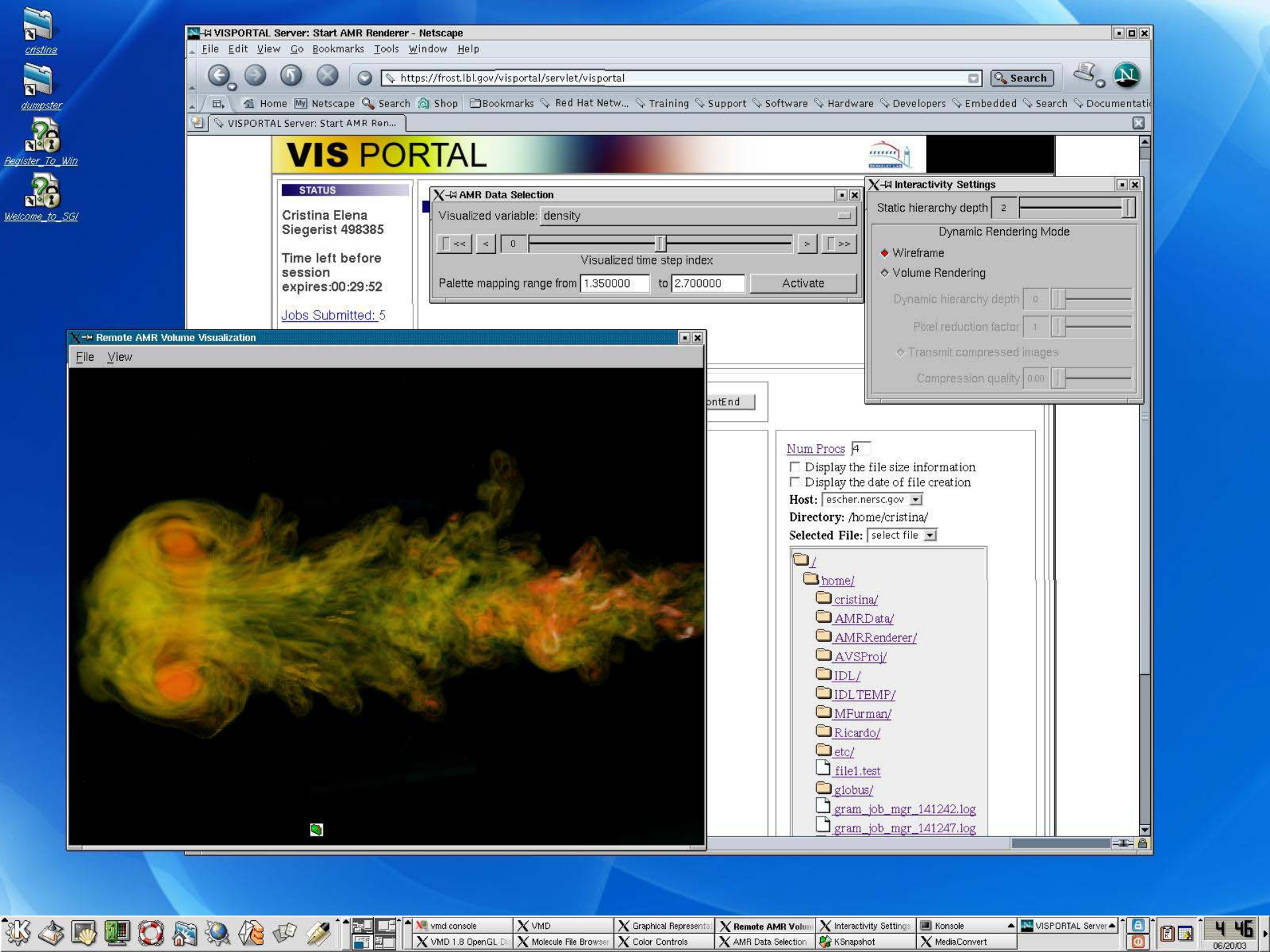
Time Step

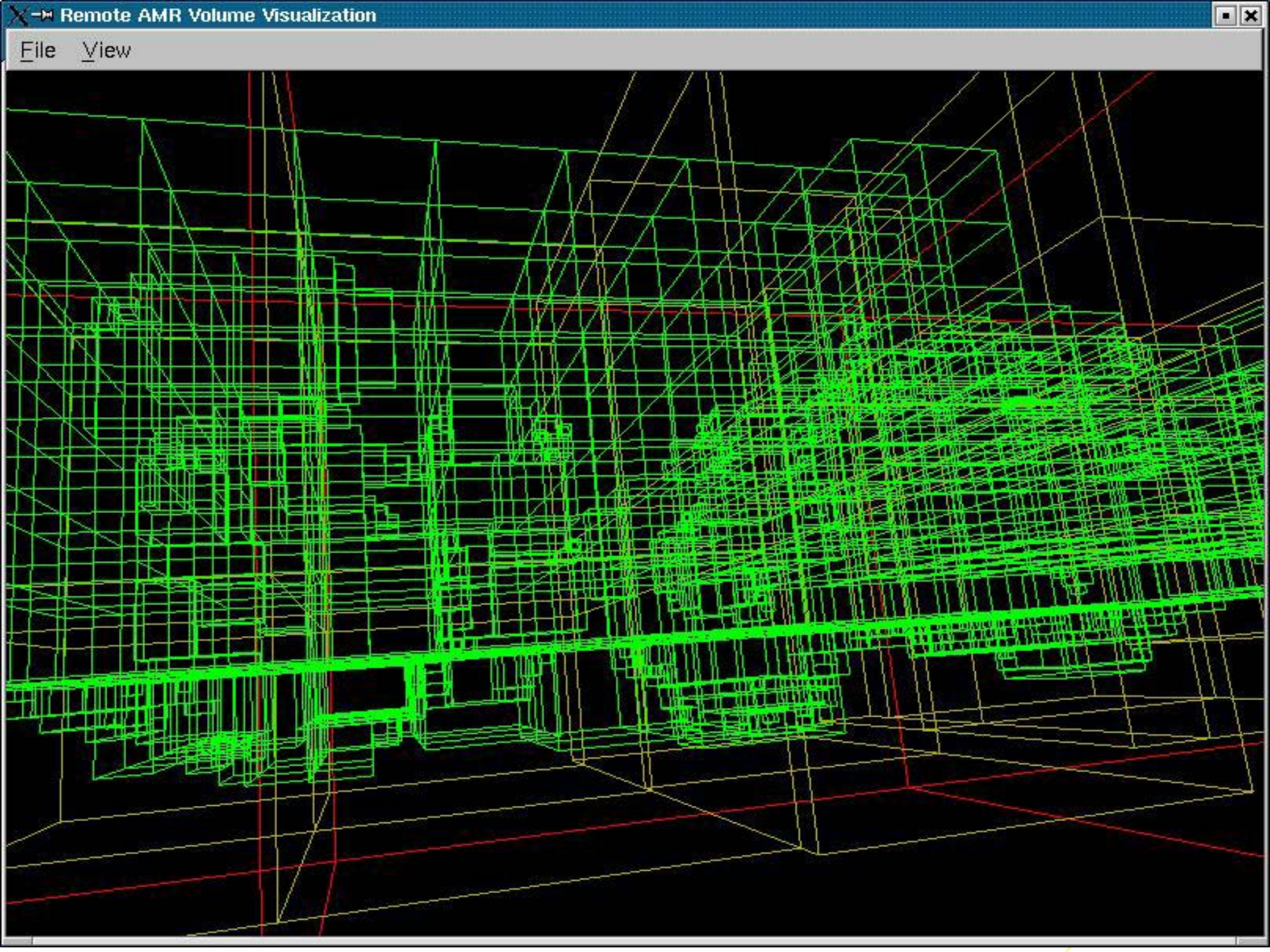
Visapult Viewer

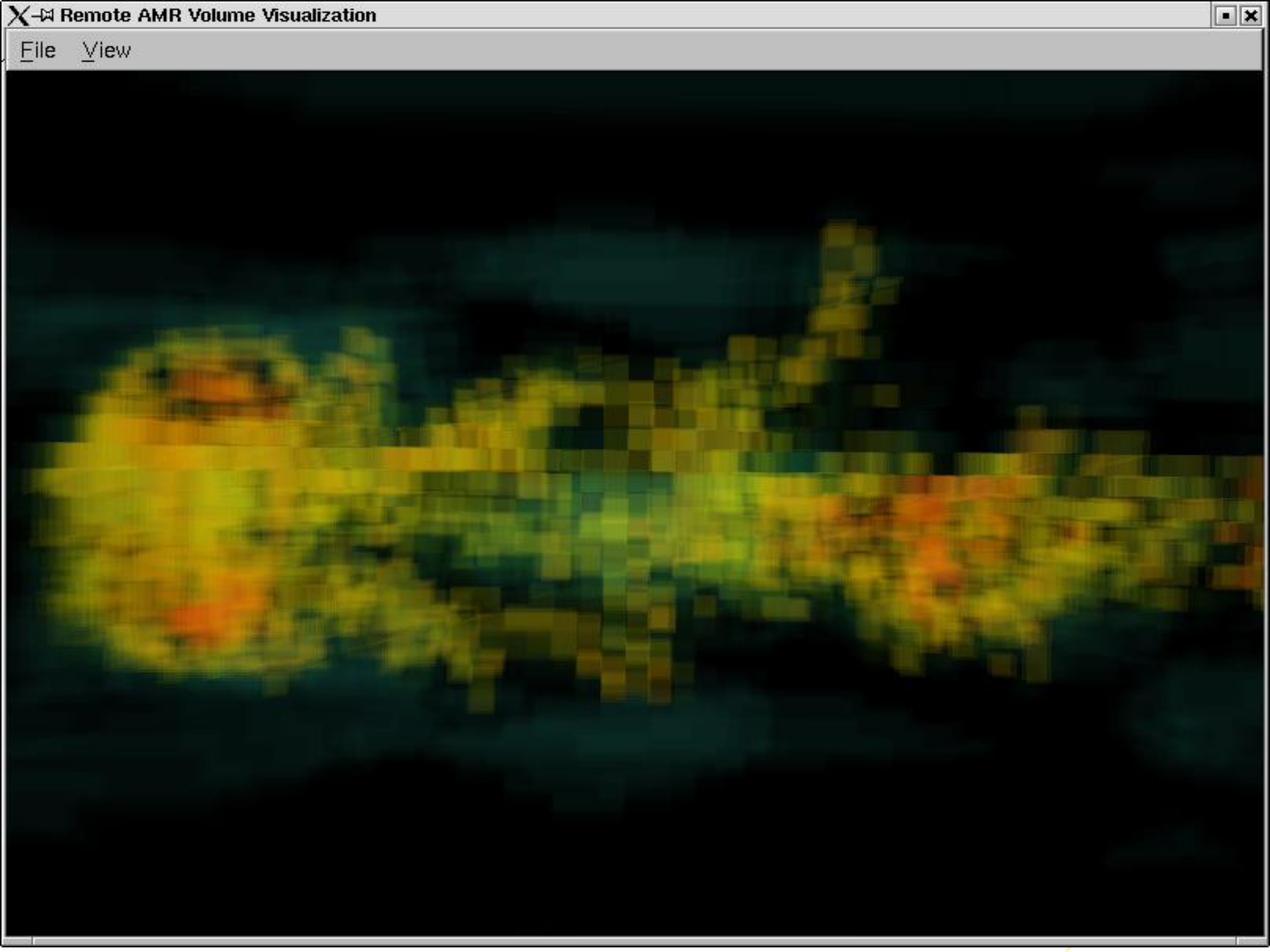
Konsole

Netscape: VISAPULT Server

01/23/03


cristina
dumpster
Register_To_Win
Welcome_to_SGI
VISPORTAL Server: Start AMR Renderer - Netscape
File Edit View Go Bookmarks Tools Window Help
https://frost.lbl.gov/visportal/servlet/visportal
Search
Home Netscape Search Shop Bookmarks Red Hat Netw... Training Support Software Hardware Developers Embedded Search Documentati
VISPORTAL Server: Start AMR Ren...
VIS PORTAL
STATUS
Cristina Elena Siegerist 498385
Time left before session expires:00:29:52
Jobs Submitted: 5
AMR Data Selection
Visualized variable: density
<< < 0 > >>
Visualized time step index
Palette mapping range from 1.350000 to 2.700000
Activate
Interactivity Settings
Static hierarchy depth 2
Dynamic Rendering Mode
Wireframe
Volume Rendering
Dynamic hierarchy depth 0
Pixel reduction factor 1
Transmit compressed images
Compression quality 0.00
Remote AMR Volume Visualization
File View
Num Procs 4
Display the file size information
Display the date of file creation
Host: escher.nersc.gov
Directory: /home/cristina/
Selected File: select file
/
home/
cristina/
AMRData/
AMRRenderer/
AVSProj/
IDL/
IDLTEMP/
MFurman/
Ricardo/
etc/
file1.test
globus/
gram_job_mgr_141242.log
gram_job_mgr_141247.log
vmd console
VMD
Graphical Representati
Remote AMR Volum
Interactivity Settings
Konsole
VISPORTAL Server
VMD 1.8 OpenGL Di
Molecule File Browser
Color Controls
AMR Data Selection
KSnapshot
MediaConvert
4 46
06/20/03


Remote AMR Volume Visualization
File
View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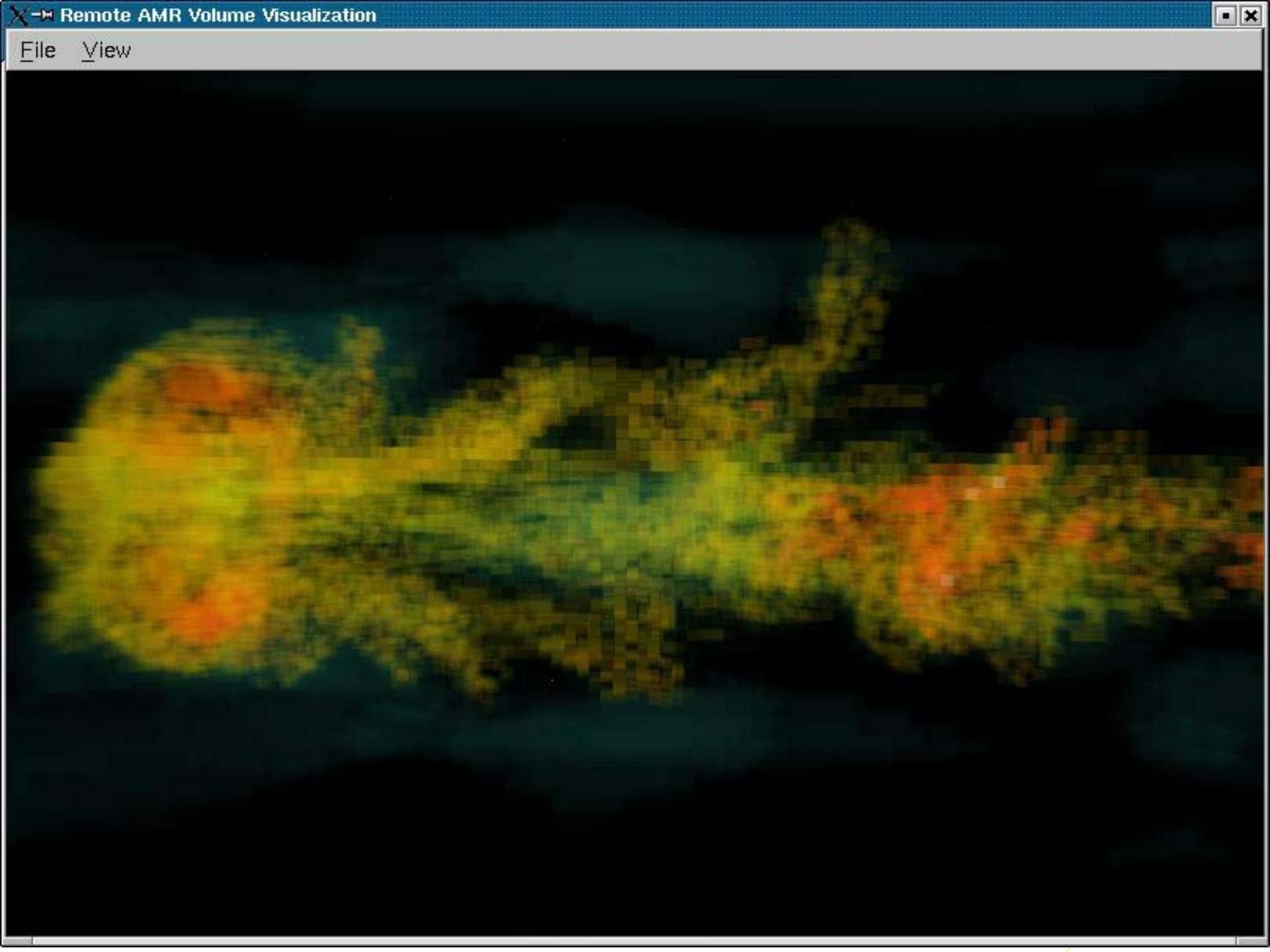
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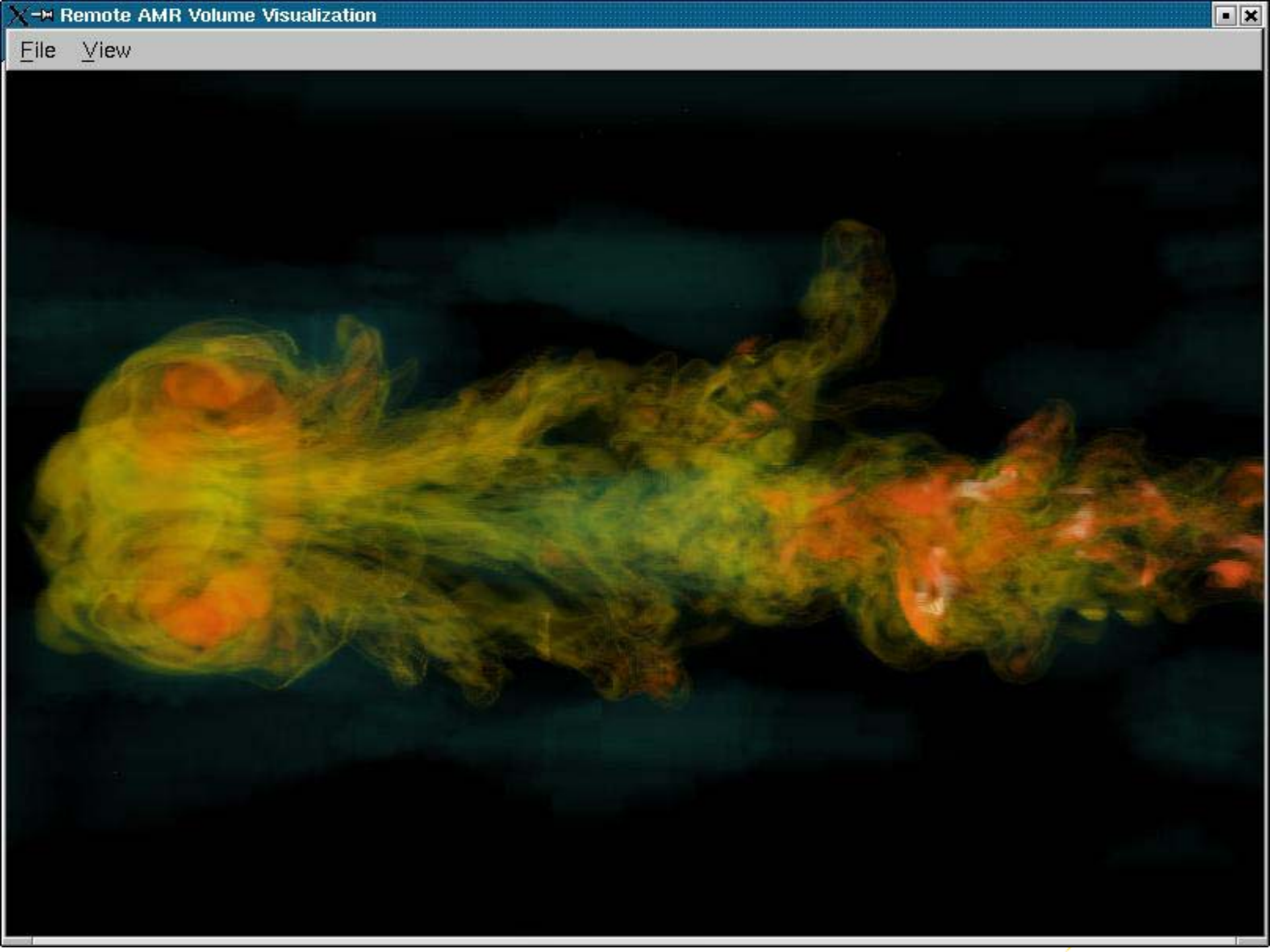
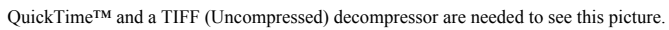

Remote AMR Volume Visualization
File
View

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.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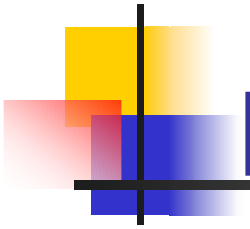

Placeholder for MPEG Gen

Future

- Implementing specific user workflows
  - Global Climate Models (*Wehner*)
  - Particle Accelerator Simulations (*Aadelman*)
- Integration with other portal efforts
  - ASC, GridLab
- OGSA / GT3.0
- Gridlab/GridSphere (*Novotny/Russell*)
  - SQL for state storage (*ASC Portal*)
  - Portlets/Sportlets
- Integration with SRM (*Shoshani*)
  - HRM and central file indices
  - Metadata catalogs and search front-ends

Conclusions

- Good for
  - Workflow automation
  - Central data indices
  - Reducing visible complexity of Grid/Grid Apps
  - Less of a burden on cross-platform regression tests
- Bad for
  - Interactivity (that's why we have slender clients)
  - More burden for development time
  - File perms/access remains a serious unresolved problem
- Users will change the direction of this entire project

References

- The Grid Portal Development Kit, J.Novotny, Cuncurrency: Pract. Exper. 2000; 00:1-7
- Building a Portal Using GPDK: A Developers Tutorial, J. Novotny, http://doesciencegrid.org//public/events/GPDW/slides/gpdk-dev.pdf
- An Online Credential Repository for the Grid: MyProxy, J. Novotny, S. Tuecke, Von Welch, Proc.10th IEEE Symp. On High Performance Distributed Computing, 2001
- Deploying Web-based Visual Exploratin Tools on the Grid. T.J.Jankun-Kelly, O. Kreylos, J. Shalf, K-L. Ma, B. Hammann, K. Joy, E.W. Bethel. IEEE Computer Graphics and Applications, march/april 2003.
- GPDK Site: www.doesciencegrid.org
- Java CoG http://www-unix.globus.org/cog/java/
- Visapult Site http://vis.lbl.gov/projects/visapult2/index.html
- CIPIC: http://cipic.ucdavis.edu